

1 **DYNAMIC STORAGE COMPARTMENT FOR VEHICLE DOOR**

2
3 FIELD OF THE INVENTION

4 This invention relates to storage compartments, and
5 particularly relates to storage compartments designed to
6 utilize space within an automobile door or the like moving
7 vehicle, and more particularly to a door mounted storage device
8 capable of movement in response to a door window position.

9
10 BACKGROUND OF THE INVENTION

11 It is customary in many cases for a middle arm rest of the
12 front seat of a vehicle to be used as a storage compartment or
13 provided with areas where articles may be placed or deposited.
14 In particular, cup and can holders, ashtrays or oddments trays
15 are often fastened to the front end of the arm rest. When not
16 in use, they may be inserted into the arm rest to eliminate
17 risks of injury and avoid clutter. Door panels are often
18 provided with small pockets for holding maps or small items.
19 Door armrests may be provided with a hinged upper portion to
20 facilitate storage of small oddments or maps.

21 In airplanes all handbags and pocketbooks must be stored
22 either in the overhead compartment or under the forward seat.
23 Such precautions are necessary because they can become missiles
24 in the event of severe turbulence or a crash. In airplanes,

1 the greatest risk is during take-off and landing but in car
2 travel the risk of accident is continuous. The need to store
3 pocketbooks is therefore continuous.

4 However, within the limited interior space of most
5 vehicles, especially those constructed without a middle
6 armrest, typically there are not provisions for storage of
7 larger articles such as a women's handbag. Handbags are often
8 placed on top of a seat within the passenger compartment or
9 they are dropped into the floor area for storage during
10 driving. These unsecured articles may create a dangerous
11 condition in the event of an accident, wherein they may act as
12 projectiles flying through the air.

13 Women have long sought for a place to store their handbags
14 to be conveniently available when needed. There are innumerable
15 examples of working women and stay at home moms taking their
16 children to school or elsewhere and passing a drive-in to pick
17 up coffee, a soda, dinner or a snack. The handbag is often in
18 the back seat and a hassle ensues to retrieve it. The same is
19 true when passing a toll booth. No storage area exists that is
20 specifically constructed to accommodate a handbag.

21 In addition, theft of personal articles from automobiles
22 is an ever-growing problem. The use of vehicle alarms, while
23 of benefit in reducing the number of actual vehicle thefts, is
24 of little value in reducing the number of so-called "smash &

1 grab" robberies. These robberies are events of opportunity,
2 often precipitated by the perpetrator's ability to view the
3 object of their desire, at which point they can quickly break
4 in, grab the merchandise, and quickly get away, before the
5 tripping of an alarm device becomes a matter of any
6 consequence.

7 What is lacking in the art is a device for securely and
8 inconspicuously storing valuable items, such as a woman's
9 handbag, within an automobile door cavity so as to provide
10 convenience, increase safety and reduce the likelihood of
11 theft. The storage space should provide some degree of side
12 impact shock absorption and the storage space should provide
13 some dis-incentive to break into a car for valuables.

14 15 DESCRIPTION OF THE PRIOR ART

16 Various attempts have been made in the prior art to
17 develop means for storing personal items in a manner to provide
18 personal convenience and to keep the stored articles out of
19 view.

20 For example, Barker, U.S. Patent No. 4,023,873, discloses
21 a combination armrest, trash receptacle, ashtray and cash
22 container formed from an elongated rectangular member having a
23 horizontal top forming an arm rest. The horizontal section is
24 provided with a hinge rod and the horizontal member having

1 three separate doors hinged to the rod so that the three
2 compartments therein can be separately opened.

3 Laesch, U.S. Patent No. 5,613,723, discloses a storage
4 armrest mounted on a vehicle door. The storage armrest
5 includes a door hingedly mounted thereon, with a hold-open
6 device integrally molded on the door and in the storage
7 compartment. The hold-open device includes a substantially one-
8 fourth circle cam molded on an inner surface of the door, and
9 a flex finger molded on an upper surface of the storage
10 compartment. The flex finger serves to hold the door open until
11 manually forced downwardly, thereby bending the flex finger
12 while the cam moves therepast to allow the door to be closed.

13 Ramanujam, U.S. Patent No. 5,967,594, discloses a vehicle
14 door structure having an armrest which is retractable such that
15 it projects into the vehicle when the door is closed and is
16 retracted against the door when the door is open.

17 Johnson et al, U.S. Patent No. 6,161,896, disclose a
18 storage system for an automotive vehicle which is preferably
19 deployed underneath the rear seat structure, for example, below
20 the seat bottom structure. The storage system can include any
21 number and combination of selectively operable sliding trays,
22 pivoting trays, collapsible trays, pivoting lids, storage bins,
23 and track systems.

24 Radcliffe, U.S. Patent No. 4,832,241, discloses a vehicle

1 portable-office organizer designed to be detachably mounted to
2 the passenger seat of a vehicle.

3 Various patents are directed to center consoles located
4 between the driver and passenger seats. These patents include
5 U.S. Patent Nos. 6,419,314, 6,264,261, 5,076,641, 6,135,529,
6 6,033,015, 4,417,764, and 6,497,441.

7 Scheerhorn, U.S. Patent No. 6,419,314, discloses a center
8 console armrest storage compartment which includes a hinged
9 cover assembly including a base hinged to the storage
10 compartment and a cover slidably mounted to the base by a slide
11 assembly. The slide assembly, in one embodiment, includes a U-
12 shaped rod which is secured to the base and a pair of sleeves
13 mounted to the cover with a polymeric slide material extending
14 between the rod and sleeves to allow the cover to slide
15 forwardly and aft with respect to the base. In a preferred
16 embodiment, the base, when uncovered by moving the cover
17 forwardly, includes a storage tray, cup holder or other
18 accessory, which is stacked above the storage compartment.

19 De Angelis et al., U.S. Patent No. 6,135,529, disclose a
20 multi-position sliding center console for a vehicle and a guide
21 member for mounting the console to the vehicle. The center
22 console is of the type including at least one storage
23 compartment and an associated lid. The guide member defines a
24 reciprocal path from a first end of the guide to a second end

1 of the guide. The first end of the guide is adjacent a set of
2 front passenger seats and the second end of the guide is
3 adjacent a set of rear passenger seats. A carriage is
4 operatively coupled between the console and the guide member
5 for slidably moving the console on the guide member along the
6 reciprocal path between the front and rear passenger seats.

7 Krafcik, U.S. Patent No. 6,264,261, discloses a vehicle
8 console which is adapted to store a child safety seat and is
9 further adapted to operatively and movably support and position
10 the child safety seat within the vehicle. The console includes
11 a pair of child seat attachment members which removably connect
12 the child safety seat to the console, and a lip or flange
13 portion which allows the child safety seat to be securely
14 supported by the console when deployed within the vehicle.

15 Lindberg, U.S. Patent No. 5,076,641, discloses a center
16 console vehicle armrest which includes a storage compartment
17 formed therein and having a cover which opens in two directions
18 to increase accessibility to the inside of the compartment. A
19 preferred embodiment includes an intermediate ring pivotally
20 coupled to the cover and to the compartment and latches for
21 allowing the cover and ring to pivot open in one direction and
22 the cover to pivot open in another direction

23 Husted, U.S. Patent No. 6,033,015, discloses an armrest
24 assembly comprising a bin defining a storage compartment and a

1 cover hinged to the bin for movement between open and closed
2 positions. A shaft rotatably supports the cover on the bin for
3 pivotal movement of the cover relative to the bin. A helical
4 torsion spring is coiled about the shaft and has one end
5 reacting with the bin and the other end reacting with the cover
6 for continuously urging the cover to the open position. A
7 detent, having at least one camming surface, is disposed on the
8 shaft for engaging the bin and is rotatable with the cover for
9 retaining the cover in at least one detent position. The detent
10 is located between the bin and the spring. Accordingly, the
11 spring continuously biases the detent axially against the bin
12 and also continuously biases the cover to the open position.

13 Bargiel, U.S. Patent No. 6,508,508, discloses an armrest
14 storage unit comprising a compartmentalized pullout armrest
15 assembly which includes a cover, an armrest storage
16 compartment, and a seat cushion with an understorage
17 compartment. The armrest storage compartment includes
18 maneuverable dividers for changing the storage compartment as
19 desired, a removable coin holder and a power supply. The
20 armrest assembly can be positioned to provide a third seat.

21 Marcus et al., U.S. Patent No. 4,417,764, disclose an
22 armrest for a vehicle which integrally includes a drawer having
23 a holder for different types and sizes of beverage containers.
24 The drawer is releasably secured within a compartment, integral

1 with the armrest, and includes a floor having an aperture
2 therethrough for receiving generally cylindrical objects such
3 as cups. U-shaped legs are pivotally mounted under the floor to
4 be positioned below the apertures to support the bottom of a
5 cylindrical container. In the preferred embodiment the
6 compartment further includes a slide with recesses for holding
7 a writing instrument and writing media such that the slide
8 forms a support for writing on the media.

9 Mahmood et al., U.S. Patent No. 6,497,441, disclose a
10 multipurpose console for use in a vehicle having a support
11 structure having an internal compartment, a latching mechanism
12 being fixedly secured to a lower surface of the support
13 structure and providing a means for releasably engaging a
14 mounting member of the vehicle. The internal compartment has a
15 lid pivotally secured to an upper portion of the support
16 structure and moves between a first position and a second
17 position. The lid covers the internal compartment when the lid
18 is in the first position and the lid has an upper portion and
19 a lower portion. The upper portion is pivotally secured to the
20 lower portion for movement between the first position and the
21 second position. The upper portion and the lower portion define
22 a surface area for changing a child's diaper when the upper
23 portion is in the second position. The internal compartment
24 provides a plurality of storage areas for products necessary to

1 facilitate the changing of the child's diaper. The multipurpose
2 console also includes an electronic entertainment device.

3 Prior art patents which are directed to door-mounted
4 storage armrests (U.S. Patent Nos. 3,104,131, 4,023,873 and
5 5,613,723) do not disclose storage compartments which extend
6 into the vehicle door cavity to provide a deeper storage area.
7 The instant invention satisfies a long-felt need for adequate
8 and accessible vehicle storage by providing a device which is
9 designed to be placed in a recessed position within the vehicle
10 door cavity, thereby taking advantage of the increased depth
11 thus obtained.

1 SUMMARY OF THE INVENTION

2 The present invention provides means for expanding the
3 usable interior space of a vehicle, either as original
4 equipment installed by the manufacturer or as an after-market
5 modification, so as to provide a means for providing storage
6 capacity for a vehicle which is characterized by ease of use
7 and the ability to provide secure storage for women's handbags.

8 To achieve this result, the instant invention utilizes the
9 interior space of a vehicle door. The invention utilizes the
10 space within the vehicle door and still accommodates the
11 opening of the car window. This is accomplished by having a
12 box within a box, the inner box being slightly smaller, which
13 pushes forward one half inch to accommodate the window as it
14 comes down upon opening. There are small covered springs
15 attached to the outer frame, at each corner of the outer box,
16 which springs are attached to the inner box, keeping the two
17 boxes aligned and providing some energy to push the inner box
18 back into the door cavity as the window is raised. The
19 exterior covering of the outer box is a reinforced pleated
20 vinyl or leather in conformity with the cars interior. The
21 material and pleats provide for expansion as well as the side
22 flaps.

23 The storage compartment has, opposite sides, a top and a
24 bottom for connecting peripheral portions of a front and a back

1 panel member so that the panel members face each other to form
2 front and back inner boundaries of an interior portion of the
3 storage compartment, a interior portion which is preferably
4 accessible from the top side or front side of the storage
5 compartment. The interior portion of the storage compartment
6 may also include padding to further protect the stored items.

7 The construction of the storage compartment facilitates
8 storage of many different sizes and types of articles, e.g. a
9 make-up bag, handbag, pocket book, writing instruments,
10 smoker's requisites, a headset or the like. In an advantageous
11 development of the invention, the storage compartment is
12 provided with a closable covering means illustrated generally
13 as a flap, roller blind or lid. The covering means is
14 advantageously capable of pivoting about an axis at the edge of
15 the recess, or winding around an axis in combination with a
16 spring retraction mechanism, wherein the point at which the
17 axis is provided is preferably at or along the edge of the
18 storage area in which is situated for placement of articles
19 within the storage compartment. In addition, the covering
20 means is preferably latchable such that articles may be secured
21 so that they remain in position, particularly in the event of
22 an accident. In this manner, the contents of the storage
23 compartment are fixed in position and, particularly in the
24 event of an accident, the risk of injury from flying articles

1 or as a result of impact with hard inner surfaces of the
2 storage compartment is avoided. Thus, the covering means in
3 the present invention is a device for safeguarding the contents
4 of the storage compartment.

5 It is also conceivable to design the storage compartment
6 as a shock absorber which may be used to cushion side impacts
7 of the vehicle. In this embodiment the outside of the roller
8 blind or lid may be provided with a covering and, optionally,
9 a thin layer of padding. The visual appearance of the storage
10 compartment is also enhanced in this manner.

11 Accordingly, it is a primary objective of the instant
12 invention to provide enhanced vehicle storage capacity by
13 utilizing the heretofore unused space within a vehicle's door
14 by way of provision of a dynamic receptacle for accommodating
15 bulky items, such as women's handbags therein.

16 It is a further objective of the instant invention to
17 provide enhanced and coverable storage capacity which places
18 articles within the vehicle out of view, so as to reduce the
19 incidence of theft.

20 It is yet another objective of the instant invention to
21 provide in-door storage the volume of which is adjustable as a
22 function of window position.

23 Still another objective of the instant invention is to
24 provide an additional, easily accessible storage compartment

1 useful for women's handbags.

2 Still yet another objective of the instant invention is to
3 provide a storage compartment utilizing space within the
4 vehicle door cavity while the functionality of the window and
5 other equipment contained within the door are retained.

6 Other objects and advantages of this invention will become
7 apparent from the following description taken in conjunction
8 with the accompanying drawings wherein are set forth, by way of
9 illustration and example, certain embodiments of this
10 invention. The drawings constitute a part of this
11 specification and include exemplary embodiments of the present
12 invention and illustrate various objects and features thereof.

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1 BRIEF DESCRIPTION OF THE FIGURES

2 Figure 1 is a perspective view of a preferred embodiment
3 of the instant invention illustrated secured within a vehicle
4 door;

5 Figure 2 is a partially exploded view of the preferred
6 embodiment illustrated in Figure 1;

7 Figure 3 is an exploded view of the preferred embodiment
8 of the instant invention;

9 Figure 4 is section view along lines 1-1 of Figure 1
10 illustrating the relative motion of the front and back panels
11 with respect to downward motion of the vehicle window;

12 Figure 5 is a perspective view of an alternative
13 embodiment of the instant invention illustrated secured within
14 a vehicle door;

15 Figure 5A is a perspective view of the embodiment
16 illustrated in Figure 5;

17 Figure 5B is a front view of the embodiment illustrated in
18 Figure 5;

19 Figure 5C is a partial front view of the embodiment shown
20 in Figure 5 illustrated with the front panel removed;

21 Figure 5D is a partial perspective view of the embodiment
22 shown in Figure 5;

23 Figure 5E is a bottom view of the embodiment illustrated
24 in Figure 5;

1 Figure 5 is a partial front view of the embodiment shown
2 in Figure 5 illustrating the pivotal movement of the top flap
3 member;

4 Figure 6 is a partially exploded view of the embodiment
5 illustrated in Figure 5;

6 Figure 7 is section view along lines 2-2 of Figure 5
7 illustrating the relative motion of the front and back panels
8 with respect to downward motion of the vehicle window;

9 Figure 8 is a perspective view of an alternative
10 embodiment of the instant invention;

11 Figure 9 is a perspective view of an alternative
12 embodiment of the instant invention;

13 Figure 10 is a perspective view of an alternative
14 embodiment of the instant invention;

15 Figure 11 is a perspective view of an alternative
16 embodiment of the instant invention.

1 DETAILED DESCRIPTION OF THE INVENTION

2 The instant invention provides a storage compartment
3 adapted for insertion within and upon an interior panel of a
4 vehicle door. With reference to Figures 1 and 2, a storage
5 compartment 100, having a front panel member 10, a back panel
6 member 12 and a center panel member 14 is provided. The
7 storage compartment 100 is constructed and arranged for
8 mechanical engagement within and upon a surface of an interior
9 panel 23 of a vehicle door 22. Neither the interior panel 23
10 or the vehicle door 22 constitute a part of the instant
11 invention. Such mechanical engagement can be achieved by any
12 suitable fastening means, for example a combination of
13 brackets, screws, rivets, clips or the like, which are affixed
14 within an interior or hidden portion of the vehicle door panel,
15 at various points where the surfaces come together.
16 Alternatively, it is contemplated that the storage compartment
17 could be provided with integral attachment means, such as
18 deformable tabs (not shown) or the like which would enable
19 secure engagement of the storage compartment 100, upon
20 insertion within said vehicle door panel. Placement of said
21 storage compartment 100 within and upon said interior panel 22,
22 as illustrated, provides a storage area which is at least
23 partially recessed within an interior portion 24 of the vehicle
24 door. Referring to Figures 4 and 7, the construction and
25 arrangement of the instant invention is such that it cooperates

1 with the door window 54 to slide the storage area 100 outwardly
2 from the interior area 24 of the door 23 during downward
3 movement of the window and inwardly into the door cavity during
4 upward movement of the window.

5 Referring to Figure 3 illustrating a preferred embodiment
6 of the present invention, the back panel member 14 includes a
7 back surface 16, opposite sides 18 and 20, a top 26 and a
8 bottom 28. The sides, top and bottom each extending generally
9 perpendicular to the back surface 16. In a most preferred
10 embodiment the sides, top and bottom surfaces extend about one
11 and one half inches from the back surface and are constructed
12 and arranged to telescope inwardly and outwardly with respect
13 to the center member 12. The back panel member 14 also
14 includes a means for pressing the back panel member into the
15 center member 12 in a telescoping manner during downward
16 movement of the vehicle door window 54 (Figures 4 and 7),
17 illustrated herein as a ramping surface 36. The ramping
18 surface 36 extends between the top 26 and back 16 surfaces to
19 cooperate with the window 54 located within the vehicle door
20 22. The back panel member 14 also includes a means for
21 pressing back panel member outwardly with respect to the center
22 member 12 and into the door cavity 24 during upward movement of
23 the vehicle door window 54. In the preferred embodiment the
24 means for pressing the back panel member outward includes a
25 plurality of spring members 56 located within spring pockets 58

1 integrally formed within the center member 12. The back panel
2 member is preferably constructed of a polymeric material by
3 methods well known in the art such as injection molding. The
4 back panel member may also include an integrally formed or
5 securely attached padded surface (not shown) to protect
6 articles stored within the storage compartment.

7 The front panel member 10 includes a front surface 30
8 having an aperture 31 therethrough for placing articles within
9 the storage compartment 100, opposite sides 32 and 34, a top 72
10 and a bottom 78. The front member 10 also preferably includes
11 a covering means 42 movable between a first open position,
12 wherein articles may be placed within the storage compartment,
13 and a second closed position, wherein the covering means is
14 juxtaposed to and covering the aperture 31.

15 The center member 12 is constructed and arranged for
16 mechanical engagement within and upon a surface of an inner
17 panel 23 of a vehicle door 22. The center member 12 having
18 opposite sides 44 and 46, a top 48 and a bottom 50 for
19 connecting peripheral portions of the front and back panel
20 members 12, 14 so that the panel members face each other to
21 form front and back inner boundaries of an interior portion of
22 the storage compartment. In the preferred embodiment the sides
23 18 and 20, top 26 and bottom 28 of the back panel member 14 are
24 constructed and arranged to telescope inwardly and outwardly
25 within the sides 44 and 46, top 48 and bottom 50 of the center

1 member 12. Extending at least partially around the perimeter
2 of the center member 12 is a means of attaching the center
3 member to the inner surface of a door panel illustrated herein
4 as a flange 40. The flange preferably includes a plurality of
5 apertures 52 for fasteners well known in the art.

6 Figures 1 through 11 illustrate alternative embodiments of
7 the covering means 42. Referring to Figure 8, the covering
8 means 42 is illustrated in the form of a flexible flap 60. In
9 this embodiment, the flexible flap is flexibly engaged with the
10 front panel member 10 so as to enable the flap 60 to be lifted
11 to gain access to the interior storage area. The flap may also
12 include a fastening member 62 to releasably engage the front
13 panel member 10. In this embodiment the front surface 30 may
14 be constructed of a flexible material or rigid material or a
15 suitable combination thereof.

16 Referring to Figure 9, the covering means 42 is
17 illustrated in the form of a rigid plate 64. In this
18 embodiment the rigid plate 64 is pivotally connected via a
19 hinge 66 to the front panel member 10 so as to enable the rigid
20 plate 64 to be opened to gain access to the interior storage
21 area.

22 Referring to Figure 10, the covering means 42 is
23 illustrated in the form of a plurality of narrow elongated
24 rigid elements 68 flexibly connected in an adjacent
25 relationship. The terminal elongated rigid element 70 being

1 flexibly connected to the front panel member 10 so as to enable
2 the covering means to be retracted to a position juxtaposed to
3 the sides 32-34, top 72 or bottom 78 of the front panel member
4 to gain access to the interior storage area.

5 Alternatively, the plurality of narrow elongated rigid
6 elements 68 may be arranged to wind around an axle 72 (Figure
7 3) in a series of concentric loops 74 (Figure 4) in cooperation
8 with a spring retraction mechanism 76 (Figure 3).

9 Referring to Figure 11 the covering means 42 is illustrated
10 having a plurality of elongated rigid elements 68 arranged to
11 form a plurality of accordion-like folds. The terminal fold 72
12 being connected to the front panel member 10 so as to enable
13 the covering means 42 to be retracted to a position juxtaposed
14 to the sides, top or bottom of said front panel member to gain
15 access to the interior storage area.

16 Referring to Figures 2 and 3 the covering means 42 is
17 illustrated in the form of a flexible sheet 78. In this
18 embodiment, the flexible sheet is flexibly engaged with the
19 front panel member 10 so as to enable the sheet 78 to be lifted
20 to gain access to the interior storage area.

21 Alternatively, the flexible sheet 78 may be arranged to
22 wind around an axle 72 (Figure 3) in a series of concentric
23 loops 74 (Figure 4) in cooperation with a spring retraction
24 mechanism 76 (Figure 3).

25 Referring to Figures 5-7 a further alternative embodiment

1 of the covering means 42 is illustrated. In this embodiment
2 the covering means includes a pleated 80 front surface 30 and
3 a lid member 82 to gain access to the interior storage area.
4 The lid member 82 further includes a keyhole slot 84
5 constructed and arranged to cooperate with a pin member 86 in
6 the front surface 80 and a hingedly connected bottom 78 to
7 allow the front panel member to substantially flattened against
8 the inner door panel 23. Releasing the pin member 86 from the
9 lid member 82 allows the bottom 78 to pivot downwardly thereby
10 increasing the internal storage space.

11 All patents and publications mentioned in this
12 specification are indicative of the levels of those skilled in
13 the art to which the invention pertains. All patents and
14 publications are herein incorporated by reference to the same
15 extent as if each individual publication was specifically and
16 individually indicated to be incorporated by reference.

17 It is to be understood that while a certain form of the
18 invention is illustrated, it is not to be limited to the
19 specific form or arrangement herein described and shown. It
20 will be apparent to those skilled in the art that various
21 changes may be made without departing from the scope of the
22 invention and the invention is not to be considered limited to
23 what is shown and described in the specification and
24 drawings/figures.

25 One skilled in the art will readily appreciate that the

1 present invention is well adapted to carry out the objectives
2 and obtain the ends and advantages mentioned, as well as those
3 inherent therein. The embodiments, methods, procedures and
4 techniques described herein are presently representative of the
5 preferred embodiments, are intended to be exemplary and are not
6 intended as limitations on the scope. Changes therein and other
7 uses will occur to those skilled in the art which are
8 encompassed within the spirit of the invention and are defined
9 by the scope of the appended claims. Although the invention
10 has been described in connection with specific preferred
11 embodiments, it should be understood that the invention as
12 claimed should not be unduly limited to such specific
13 embodiments. Indeed, various modifications of the described
14 modes for carrying out the invention which are obvious to those
15 skilled in the art are intended to be within the scope of the
16 following claims.